

## CLAIMS

1. Process for the preparation of a cationic nanoemulsion, comprising the following steps:

- 5 (a) mixing, with agitation, of at least one fatty compound and at least one non-ionic surfactant at a temperature  $T_m$  above the melting point of the fatty compound(s) and the non-ionic surfactant(s), under normal atmospheric pressure, the ternary phase  
10 diagram fatty compound(s)/non-ionic surfactant(s)/water exhibiting at least one zone where a nanoemulsion phase of the oil-in-water type exists, and the concentrations of the fatty compound(s) and the non-ionic surfactant(s) being chosen so that  
15 this nanoemulsion zone can be reached simply by dilution with water,
- (b) addition of water, with agitation, so as to reach this nanoemulsion zone, and
- (c) addition of at least one cationic surfactant to  
20 the resulting nanoemulsion.

2. Process according to Claim 1, characterized in that  $T_m$  is between room temperature and 100°C.

3. Process according to Claim 1 or 2,  
25 characterized in that the weight ratio  $\tau$  of fatty compound(s) to non-ionic surfactant(s) is below 2,

preferably between 0.1 and 1.5 and better still between 0.1 and 1.

4. Process according to any one of Claims 1 to 3, characterized in that it also comprises a step  
5 for cooling to room temperature, which takes place before or after step (c).

5. Process according to any one of the preceding claims, characterized in that the cationic surfactant is added in the form of an aqueous solution  
10 or dispersion.

6. Process according to any one of the preceding claims, characterized in that the fatty compound is selected from fatty acid esters, transesterified or non-transesterified vegetable oils,  
15 and mixtures thereof.

7. Process according to Claim 6, characterized in that the fatty compound is selected from the compounds of the formula  $R_aCOOR_b$ , in which  $R_a$  is the radical of a saturated or unsaturated higher  
20 fatty acid containing from 6 to 29 carbon atoms and preferably from 8 to 22 carbon atoms, and  $R_b$  is a saturated or unsaturated hydrocarbon chain containing from 1 to 30 carbon atoms and preferably from 1 to 12 carbon atoms; sweet-almond oil, avocado oil, castor  
25 oil, olive oil, jojoba wax, sunflower oil, wheatgerm oil, sesame oil, groundnut oil, grape seed oil, soya oil, colza oil, safflower oil, copra oil, maize oil,

hazelnut oil, shea butter, palm oil, apricot kernel oil, calophyllum oil; olive oil transesterified with hexanol, jojoba wax transesterified with ethanol; and mixtures thereof.

5                   8.     Process according to Claim 7, characterized in that the fatty compound is selected from isopropyl myristate, isononyl isononanoate, jojoba wax, olive oil transesterified with hexanol, jojoba wax transesterified with ethanol, and mixtures thereof.

10                   9.     Process according to any one of the preceding claims, characterized in that at least two non-ionic surfactants are used in step (a).

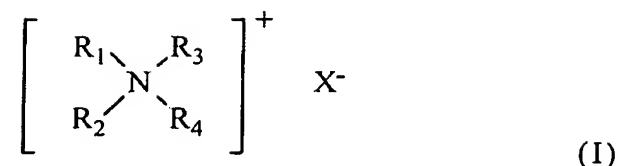
                  10.     Process according to any one of the preceding claims, characterized in that the non-ionic  
15     surfactant is selected from polyalkoxylated (2-50 mol of alkylene oxide), hydrogenated or non-hydrogenated vegetable oils, C<sub>8-30</sub> fatty acid mono-, di- or triglycerides, polyethoxylated and/or polypropoxylated alcohols, polyethoxylated and/or polypropoxylated  
20     alpha-diols, polyethoxylated and/or polypropoxylated alkylphenols having a fatty chain, it being possible for the number of ethylene oxide or propylene oxide groups to range from 2 to 50 in particular, ethylene oxide/propylene oxide copolymers, condensation products  
25     of ethylene oxide and propylene oxide with fatty alcohols; polyethoxylated fatty amides having from 2 to 30 mol of ethylene oxide, polyglycerolated fatty amides

containing an average of 1 to 5 and particularly 1.5 to 4 glycerol groups; fatty acid esters of sorbitan or polyethoxylated fatty acid esters of sorbitan having from 2 to 30 mol of ethylene oxide; fatty acid esters of sucrose, fatty acid esters of polyethylene glycol, C<sub>8-30</sub> fatty acid esters of polyglycerol, alkylpolyglycosides, N-alkylglucamine derivatives, amine oxides, such as (C<sub>10</sub>-C<sub>14</sub>-alkyl)amine oxides or N-acylaminopropylmorpholine oxides, and mixtures thereof.

11. Process according to Claim 10, characterized in that the non-ionic surfactant is selected from polyethoxylated hydrogenated castor oil with 35 EO, polyethoxylated hydrogenated castor oil with 7 EO, polyethoxylated olive oil with 7 EO, sorbitan monooleates with 4 EO, 5 EO or 20 EO, (C<sub>12</sub>-C<sub>14</sub>-alkyl)glycosides or (C<sub>8</sub>-C<sub>14</sub>-alkyl)glycosides, glycerol monostearate with 30 EO, decaglyceryl monooleate, polyethoxylated oleyl alcohol with 2 or 10 EO, polyethoxylated lauryl alcohol with 7 EO, methylglucoside dioleate, and mixtures thereof.

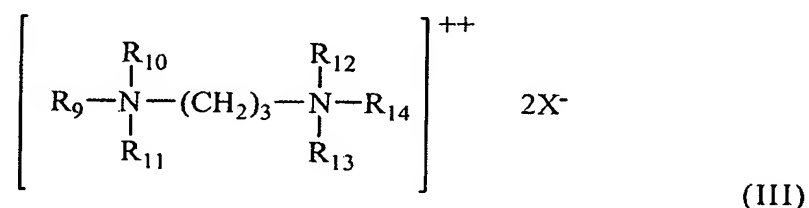
12. Process according to any one of the preceding claims, characterized in that the cationic surfactant is selected from:

- those of general formula (I) below:



in which the radicals  $R_1$  to  $R_4$ , which can be identical or different, are a linear or branched aliphatic radical containing from 1 to 30 carbon atoms or an aromatic radical such as aryl or alkylaryl; and  $X$  is an anion selected from the group comprising halides, phosphates, acetates, lactates, alkyl( $C_1$ - $C_6$ )sulphates, ( $C_1$ - $C_6$ -alkyl)sulphonates and ( $C_1$ - $C_6$ -alkyl)aryl-sulphonates;

- 10        - quaternary ammonium salts of imidazoline;
- the quaternary diammonium salts of formula (III):



15        in which  $R_9$  is an aliphatic radical containing approximately from 16 to 30 carbon atoms,  $R_{10}$ ,  $R_{11}$ ,  $R_{12}$ ,  $R_{13}$  and  $R_{14}$ , which are identical or different, are selected from hydrogen and an alkyl radical containing from 1 to 4 carbon atoms, and  $X$  is an anion selected from the group comprising halides, acetates, phosphates, nitrates and methylsulphates; and

- quaternary ammonium salts containing at least one ester group.

13. Process according to Claim 12, characterized in that the cationic surfactants are  
5 selected from palmitylamidopropyltrimethylammonium chloride, cetyltrimethylammonium chloride and behenyltrimethylammonium chloride.

14. Process according to any one of the preceding claims, characterized in that the amount of  
10 fatty compound(s) is between 1 and 30% by weight and preferably between 1 and 20% by weight, based on the total weight of the cationic nanoemulsion.

15. Process according to any one of the preceding claims, characterized in that the amount of  
15 non-ionic surfactant(s) is between 2 and 30% by weight and preferably between 2 and 20% by weight, based on the total weight of the cationic nanoemulsion.

16. Process according to any one of the preceding claims, characterized in that the amount of  
20 water is between 40 and 97% by weight and preferably between 50 and 90% by weight, based on the total weight of the cationic nanoemulsion.

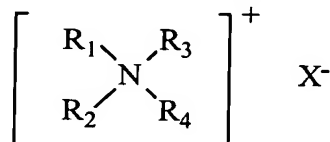
17. Process according to any one of the preceding claims, characterized in that the amount of  
25 cationic surfactant(s) is between 0.1 and 10% by weight and preferably between 0.2 and 6% by weight, based on the total weight of the cationic nanoemulsion.

18. Cosmetic composition in the form of a cationic nanoemulsion of the oil-in-water type obtainable by the process according to any one of Claims 1 to 17.

5 19. Cosmetic composition in the form of a cationic nanoemulsion whose particles have a number-average size below 100 nm, comprising at least one fatty compound and 2 to 30% by weight of at least one non-ionic surfactant in a weight ratio  $\tau$  of fatty  
10 compound(s) to non-ionic surfactant(s) that is from 0.1 to 1.5, at least one cationic surfactant and water,

said cationic surfactant is selected from:

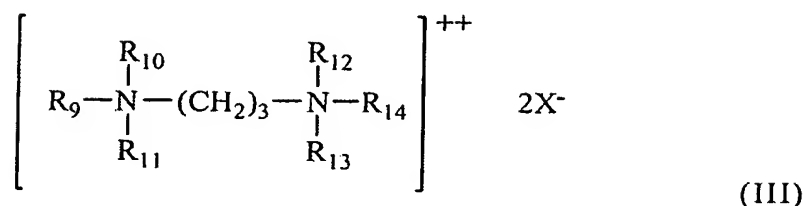
- those of general formula (V) below:



15 in which the radical  $R_1$  is a linear or branched aliphatic radical containing from 8 to 30 carbon atoms or an aromatic radical such as aryl or alkylaryl, the radicals  $R_2$  to  $R_4$ , which can be identical or different, are a linear or branched aliphatic  
20 radical containing from 1 to 6 carbon atoms; and X is an anion selected from the group comprising halides, phosphates, acetates, lactates, alkyl( $C_1$ - $C_6$ )sulphates, ( $C_1$ - $C_6$ -alkyl)sulphonates and ( $C_1$ - $C_6$ -alkyl)aryl-sulphonates;

25 - quaternary ammonium salts of imidazoline;

- the quaternary diammonium salts of formula  
(III):



5

in which  $R_9$  is an aliphatic radical containing approximately from 16 to 30 carbon atoms,  $R_{10}$ ,  $R_{11}$ ,  $R_{12}$ ,  $R_{13}$  and  $R_{14}$ , which are identical or different, are selected from hydrogen and an alkyl radical containing  
10 from 1 to 4 carbon atoms, and X is an anion selected from the group comprising halides, acetates, phosphates, nitrates and methylsulphates; and

- quaternary ammonium salts containing at least one ester group..

15            20. Cosmetic composition according to Claim 19, characterized in that the weight ratio  $\tau$  of fatty compound(s) to non-ionic surfactant(s) is between 0.1 and 1.

20            21. Composition according to any one of Claims 19 to 20, characterized in that it comprises at least two non-ionic surfactants.

22. Composition according to any one of Claims 18 to 21, characterized in that the weight ratio fatty compound(s) / (non-ionic surfactant(s) + cationic



surfactant(s)) is below 1.5 and preferably between 0.1 and 1.

23. Cosmetic composition according to any one of Claims 18 to 22, characterized in that it  
5 comprises additives selected from cationic, anionic, non-ionic or amphoteric polymers, modified or unmodified non-volatile silicones, associative or non-associative, natural or synthetic, anionic, amphoteric, zwitterionic, non-ionic or cationic polymeric  
10 thickeners, non-polymeric thickeners such as electrolytes, sugars, pearlescent agents, opacifiers, sun filters, vitamins and provitamins, perfumes, colourants, organic or mineral particles, preservatives and pH stabilizers.

15 24. Use of the cosmetic composition according to any one of Claims 18 to 23 as cleaning, dyeing or perming compositions or as treatment compositions before or after shampoo, dyeing, perming, bleaching or straightening.

20 25. Use according to Claim 24 as a hair conditioner.